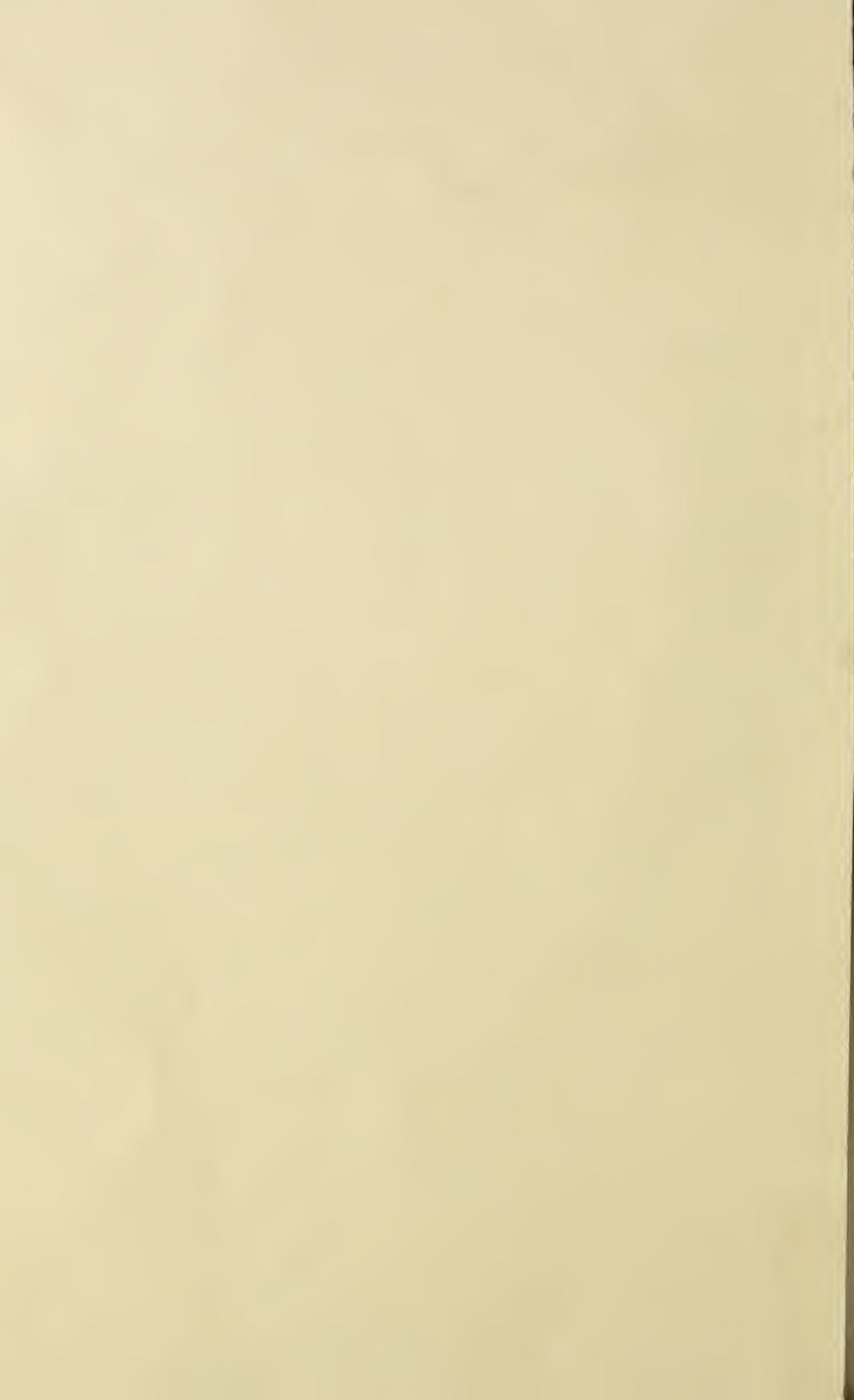


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April, 1913

The Agricultural Student

A
MONTHLY
MAGAZINE

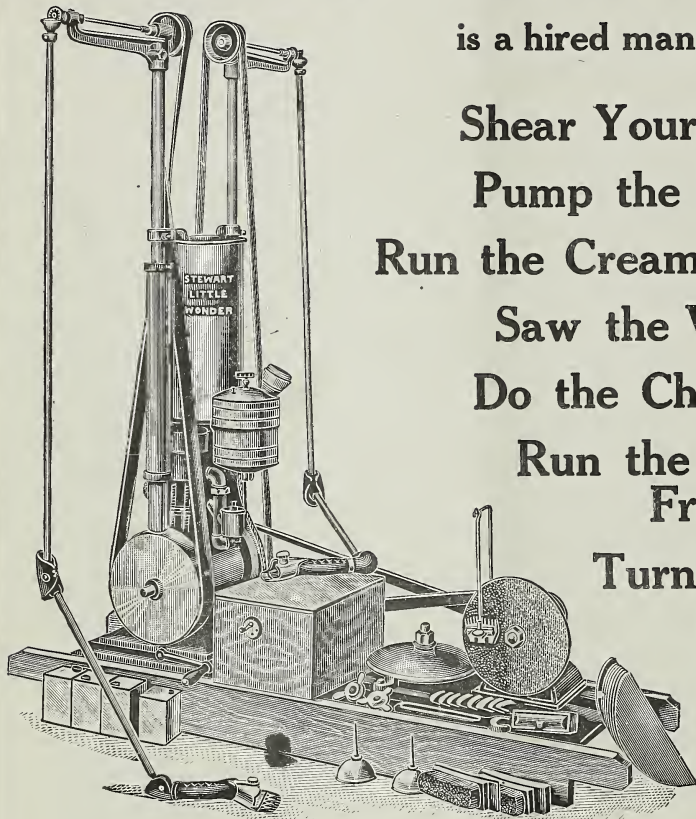
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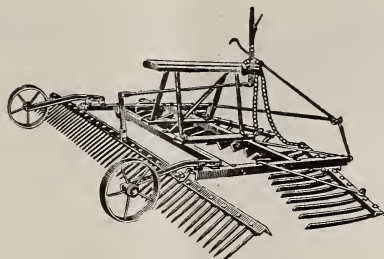
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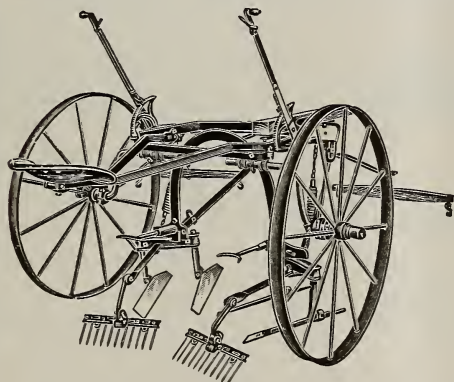
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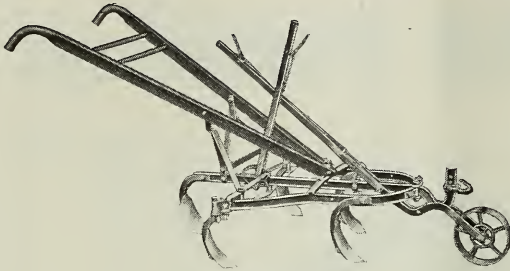
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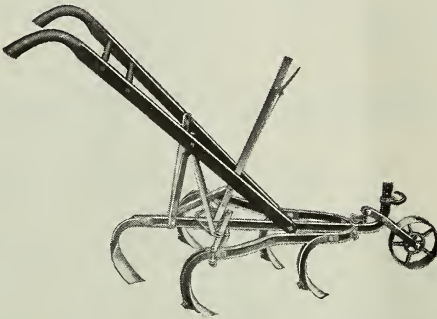
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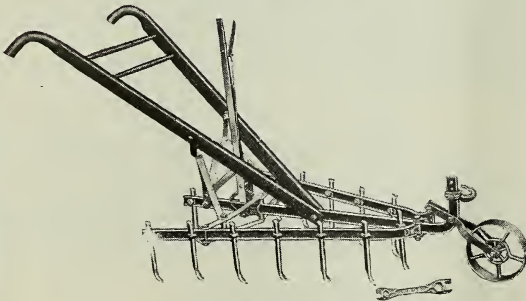
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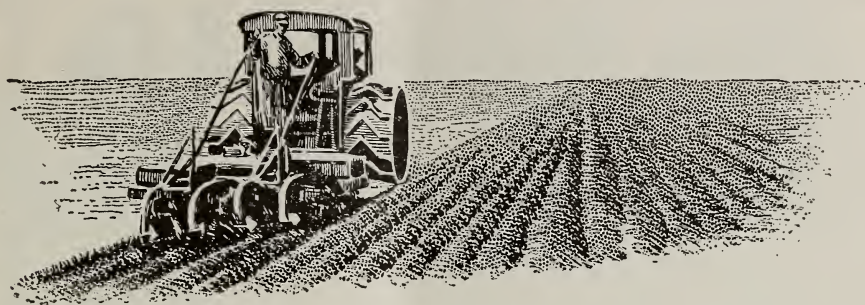
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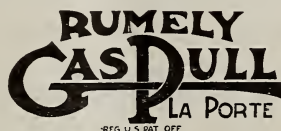


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Contents

FRONTISPIECE—A Favorite Walk—On the Campus.....	568
NEW SOURCES OF OLD FERTILIZING MATERIALS— Earl O. Jones, Department of Agricultural Chemistry.....	569
BREEDING FOR DISEASE RESISTANCE— Perry Van Ewing, Kansas State Agricultural College.....	572
ANIMAL HUSBANDRY AT THE JOHN SWANEY SCHOOL— L. O. Yoder	576
A SUMMARY ON APPLE BREEDING— C. L. Long	577
AGRICULTURAL EDUCATION IN GREAT BRITAIN— Professor Wm. R. Lazenby.....	578
EUROPEAN FLORICULTURE— Reed O. Brigham, University of Illinois.....	581
OBSERVATIONS ON LANDSCAPE WORK AT WASHINGTON, D. C.— W. E. Bontrager, Ohio Experiment Station.....	583
EDITORIAL	586-588
DEPARTMENTS	589-596
NEWS NOTES	597-599



A FAVORITE WALK.

THE AGRICULTURAL STUDENT

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OHIO STATE UNIVERSITY, COLUMBUS, APRIL, 1913

Number 8

New Sources of Old Fertilizing Materials

EARL O. JONES

Department of Agricultural Chemistry

NO one questions the importance of nitrogen in soil fertility nor the need of having a plentiful and cheap supply available for commercial fertilizers. At present the large commercial source is the saltpetre beds of Chili. An immense amount is mined there yearly by crude and wasteful methods. Last year about one-fifth of the total product was sent to this country, but a portion of this was used in the manufacture of explosives.

It is agreed that these fields are approaching exhaustion. Estimates as to their life vary from 50 to 125 years. This fact has led scientific men to realize that we must look for new sources of nitrogen as population increases and intensive farming is gradually adopted. They have turned to the inexhaustible supply of the air as a new source.

Every flash of lightning in the air forms a small amount of nitric acid which is washed down to the earth. Because of this, scientists conceived the idea of fixing nitrogen from the air by electricity or artificial lightning flashes. Any process for doing this must be cheap enough so that the product may compete with nitrate of soda. A serious difficulty in the process is that the heat required to cause the nitrogen and oxygen of the air to combine also destroys the combination as soon as it is formed. The product must be rapidly cooled so that it will remain fixed. Cheap power

is essential to the successful operation of such factories, so they are found near water falls.

The first factory of this kind was established at Niagara Falls in 1900. A cylinder studded with platinum points was built and in it was a revolving shaft also studded with platinum points. Sparks passed between these points and the nitric acid formed was treated to yield a solid nitrate. This was a commercial failure and was soon abandoned as it fixed only one and one-half per cent of the nitrogen in the air.

At present there are in operation in Europe at least three factories producing calcium nitrate. Their methods are based on the same general principles, differing only in details. Ordinary air is passed through a powerful electric arc or flame, resulting in the combination of more or less of the nitrogen and oxygen into nitric oxide (NO). On exposure to the air more oxygen is taken up to form nitrogen peroxide (NO₂), and with some intermediate steps this is converted into dilute nitric acid (HNO₃.) This is concentrated and treated with calcium oxide and carbonate forming calcium nitrate.

Ordinary calcium nitrate attracts moisture from the air and dissolves readily. Two methods are employed to overcome this difficulty. In one case lime is added to the hot solution and it is cooled and ground up. This is known

as basic lime nitrate, and contains from 9 to 10 per cent of nitrogen. In the other case the concentrated nitrate is melted and, after cooling, is ground fine and put into air tight packages. This latter product contains from 12 to 14 per cent of nitrogen.

The other nitrogen fertilizer produced from atmospheric nitrogen is calcium cyanamid or lime-nitrogen. Calcium carbide (the substance used in the production of acetylene gas) is finely ground, placed in a heated retort and a current of pure nitrogen obtained from air is passed over it. The lime-nitrogen produced is removed in the form of a hard cake, cooled out of contact with the air, ground to a powder and exposed to the air before packing. This substance has the formula CaCN_2 , calling for 30 per cent of nitrogen, but owing to impurities only about 15 per cent is present.

Lime-nitrogen is manufactured in several places in Europe and in America there is one plant, known as the "American Cyanamid Company," in successful operation near Niagara Falls. The product is changed before being put on the market and then it contains 20 to 30 per cent of its nitrogen in ammonia or nitrate form. These materials are in fine mechanical condition and are used to a considerable extent by manufacturers of complete fertilizers.

The production of these materials will undoubtedly increase unless cheaper sources of nitrogen are found. With an increased growth of legumes and with the developments that may reasonably be expected concerning soil bacteria that fix nitrogen without the aid of legumes, we may consider that the nitrogen problem will be well taken care of in the future.

Potash.

The practically inexhaustible Strass-

furt mines of Germany furnish nearly all the world's supply of potash for fertilizers. A syndicate protected by the German government controls this supply and the government levies an export tax. This syndicate has recently raised its prices and American manufacturers who had made contracts with independent producers at lower prices are compelled to pay syndicate prices because of the interference of the German government.

As there is no other source at present, the syndicate can charge all that the trade will bear and we must pay the price. This controversy has threatened at times to lead us into a tariff war with Germany. The only hope of relief from this situation is the discovery of an adequate supply of potash in our own country. The present high rates may reasonably be expected to stimulate such action.

Our government has done considerable work in investigating possible sources of potash in this country. If such a supply could be found it would not necessarily exclude German potash, but it would prevent monopoly prices. If any international difficulties should arise, our agricultural interests would not be at the mercy of a foreign power. We have in this country immense quantities of potash in feldspar and other native rocks. When these are finely ground the potash is too insoluble to be of much value. Methods for making this soluble have been worked out, but at present none are in successful operation. It is claimed that potash could be produced economically if a market could be found for certain by-products. It is probable that a method will be developed in a few years for making this material soluble if no other sources are found in this country.

At present the most promising source

of potash in this country is the groves of giant kelps or seaweeds which form immense ocean meadows along the Pacific coast of this country. These seaweeds take up the dilute potassium compounds from the ocean to such an extent that they can be made a profitable source of potash.

The kelps in the Puget Sound area contain as much as 30 per cent of potassium chloride when dried and those in the South contain from 20 to 30 per cent potassium chloride. The maximum yield possible from these is estimated to be 8,000,000 tons of potassium chloride yearly, but a yield of 1,000,000 tons yearly would be three times as much as is at present imported from Germany. The iodine obtained as a by-product should go far towards paying the expenses of harvesting.

If these beds are properly protected and harvested they ought to yield annually 1,000,000 tons of potassium chloride besides iodine and other valuable by-products. This would turn a waste and a nuisance into a source of great commercial value. Even if German salts could be purchased cheaper on the Atlantic Coast because of the cost of railway transportation the syndicate would not dare advance its prices beyond certain limits.

Phosphates.

Florida, South Carolina and Tennessee furnish at present the main sources of phosphate rock in this country. Recently large deposits of high grade rock have been found in Montana, Idaho, Utah and Wyoming and these have been developed only slightly. The land containing these deposits has not been opened to settlement by the government to prevent waste of these phosphates to private exploitation.

Students of the question have for

some time been concerned for fear of an exhaustion of the phosphate beds of this country. It has been commonly believed that our available phosphates, both low and high grade, would be exhausted in a comparatively short time. The Bureau of Soils estimates from their surveys that at three times the present rate of consumption the phosphate fields will last about 1200 years, while other estimates are as low as 200 years. For the last twenty years the rate of production has more than doubled every decade, but we cannot say whether this rate will be kept up or not. It is time we were taking steps to prevent needless waste of phosphate rock and to devise profitable methods of using the low grade rock.

At the present time no high grade rock (containing over 72 per cent calcium phosphate) is used in this country, as practically all of it is exported to Europe. Nearly one-half of all the rock mined in this country is sent to Europe. With the supply rapidly approaching exhaustion we are shipping large amounts of this valuable fertilizing constituent to foreign countries. With the deposits in the South this cannot easily be prevented, but it has been suggested that the government retain control of the deposits in the West and lease them on condition that they be used for home consumption only.

We may therefore conclude that with the exception of phosphorus no one need worry concerning a possible exhaustion of fertilizing materials. The phosphorus problem should be thoroughly investigated by the government and all possible precautions taken to conserve our natural resources along this line. At all times cheaper sources of nitrogen and potash will be of great value to our agricultural interests.

Breeding for Disease Resistance

PERRY VAN EWING
Kansas State Agricultural College

ONE of the most promising fields of activity for applying the newer principles of animal breeding to practical problems is offered in the search for strains of disease resistant animals. Scientists in several countries are now experimenting with both animals and plants, with the object of securing immunity from one or more of the particular diseases to which the plant or animal may be subject. It cannot be doubted but that studies of this sort are of the highest importance, both theoretically and practically.

In all their work the scientists engaged in this problem seem to be following one of two methods, and sometimes both together. The first method is the selection of individuals that when exposed to the disease against which immunity is sought, have shown more or less resistance to the disease. The other is the breeding of non-resistant animals with races that have shown more or less natural resistance to the disease. It is the hope of the Mendelianist that by this second method we may be able to transmit this resistance character from an immune to a susceptible strain with great economic advantage.

It is already a well known fact that disease resistance qualities can be bred into plants. Professor Bolley has demonstrated this in his work at the North Dakota Experiment Station. He has succeeded in breeding varieties that possess the wilt and canker-resistance qualities to a very marked degree. He has accomplished this principally through the selection of hardy plants. Whenever a field becomes badly infested with flax-wilt nearly all of the plants wither and die, but there are in-

variably a few that survive. For some unknown reason these few are capable of warding off the attacks of the disease.

The resistance to potato blight has been shown by Salaman of England to be a Mendelian character and transmutable from one strain to another. Either total or partial immunity disease resistance is known to exist in many forms of plants, and there is reason to believe that this resistance is likewise inherited in a Mendelian fashion and consequently controllable. Examples of this disease resistance in plants are seen in the common pear blight, where the Keiffer pear alone shows very marked resistance; in several leaf spot fungi, where natural immunity exists in some strains and varieties; in the American wheat rust, where several varieties of rust immune wheat have been obtained; in tomato blight, where Essary in bulletin 95 of the Kentucky Station reports several strains as being naturally immune; as in flax wilt as previously noted; and in many other forms.

The laws of animal breeding are apparently the parallel of those of plant breeding, and among animals certain individuals and frequently varieties of species manifest natural resistance, either wholly or in part, to certain diseases to which other closely allied individuals are very susceptible. This phenomenon is especially noticable in the condition where certain wild species are apparently immune to certain diseases to which the domestic varieties of the same species are very susceptible, and vice versa.

The bulk of our scientific knowledge on the inheritance of disease in ani-

imals relates to man. A large number of diseases and malformations in man have been proven to be inherited in a Mendelian fashion.

Commonplace examples of the existence of natural resistance to disease are seen in the case of the hook worm disease. The colored people, while carrying the disease, were immune to its effects and were able to transmit the

ples of either total or partial resistance to diseases that are known to exist in other animals. There are several organisms pathogenic to mice, where closely related varieties differ as to their susceptibility and resistance. In the case of yellow fever, the negro is highly immune while the white man is very susceptible; in the instance of the surra organism, the indi-



LABORATORY ARRANGED FOR THE STUDY OF MICE.

disease to white people, who were not immune to its effects. Dr. Styles, the discoverer of the cause of this strange disease, made the discovery by ascertaining that it was an African disease, which had been brought to this country by negroes, who from being long accustomed to it, had acquired a large amount of immunity from its effects.

In addition to these examples mentioned in man, there are several exam-

viduals of *Bos Indicus*, or the humped cattle of India, carry the organisms in their blood but are not afflicted by the same, while the individuals of *Bos Taurus*, or the European cattle, are very susceptible; and in many other diseases, both in man and in the lower animals, we frequently find individuals that will not take a certain disease or that show a greater or less amount of resistance to the same.

Knowing that natural resistance to disease is a fact, the first step is to determine its nature, especially as regards its methods and laws of inheritance and the means at hand for controlling the same. To make studies of this nature requires first a thorough knowledge of the fundamental principles of animal breeding. Secondly, the services of a thoroughly trained bacteriologist and animal pathologist are essential. This is a combination frequently difficult to make, which commonly renders experimentation of this kind impossible in the first instance.

So far as the material with which to work is concerned, we have almost unlimited possibilities. If it is desirable that the work be done with animals, mice offer special advantages for experimentation of this sort. The period of gestation is twenty-one days and the females will breed again immediately upon giving birth to young. They breed at from eight to twelve weeks of age so that it is possible to get three or four generations a year. Thus, by the use of mice, some of the basic principles of the methods of inheritance of resistance to disease may be obtained quicker than with any other animals. With the common house mice and the fancy or white mice some very valuable experiments could be tried. These mice are different varieties of the same species, the most conspicuous difference being the color.

At the present time John W. Calvin and the writer are running an experiment with mice, such as just suggested. In attempting to obtain a disease resistant strain by the first method a dose very slightly less than the minimum lethal dose will be given to large numbers of mice, and the remaining animals will then be interbred and back-

crossed to secure if possible a true-breeding, highly resistant strain.

In the attempt to obtain a disease resistant strain by the second method, an organism *Micrococcus tetragenus*, is being used to which white mice are susceptible and gray mice much more resistant. The object is, of course, to obtain a strain of white mice that is resistant to the organism. The procedure is stated briefly as follows. The breeds are first crossed and the hybrids then interbred. The resultant, or F₂, generation is tested by a uniform method of infection. If susceptibility is dominant and immunity or resistance is recessive we can readily see that any resistant offspring in the F₂ generations would breed true. Likewise, since white is recessive, any white resistant mice in F₂ generation would breed true white resistant and the desired object would be accomplished. This is all purely hypothetical, of course.

The same method as applied to mice could be applied to large animals. Poultry offers an excellent field. Some strains, notably some of the Asiatic breeds, and occasionally individuals offer peculiar resistance to chicken cholera. Hogs likewise offer a most excellent field. Practically the same methods as applied to mice could be used in endeavoring to secure a strain of hogs that are resistant to the hog cholera virus. Owing to the fact that most of the improved breeds of hogs show the variation in their resistance to the hog cholera virus, it is quite probable that in the long run the the first method offers the best field, especially since deleterious results must necessarily accompany crossing with unimproved strains.

Even with the most virulent strains of the disease there are animals that

survive. The relative number that survived would be largely dependent upon the virulence of the strain of the virus causing the disease. Some forms are very light and occasionally as high as fifty per cent of the afflicted animals recover. In all probability all of the animals did not have the disease, but in such a light form in the apparently immune ones that only the thermometer could have detected its presence. In the more virulent forms of the disease we find that frequently the number of immune animals is as low as one in two hundred and fifty. This would be the type of a hog by which we should hope to obtain an immune strain by the first method.

This method may have been tried out by some one before this; if so, it has probably not been carried out in a sufficiently scientific manner to justify its acceptance. A breeder of Poland Chinas of Platte City, Missouri, claims to have tried out these very experiments with negative results, but since exactly opposite results on the same experiment have been recorded the field remains entirely open. This question never will be settled until one of the corn-belt Experiment stations takes the matter up, and it will not be many years before they will be working on the problem.

The method of obtaining these hogs

which have withstood an attack of the disease would be to go into the corn-belt during the late summer and select those places where the disease was most prevalent, and where the disease was in its most virulent form. Observations would be made on several afflicted herds of breeding animals, and when a resistant hog was found it would be procured together with a particular strain of the cholera virus. If several resistant hogs could be obtained from the same disease zone, so much the better. These animals would then be interbred and back-crossed, and the resultant offspring again exposed to the disease. Any susceptible or low restraint animals that were present would succumb while the more highly resistant would remain to constitute the basis of an immune herd or strain. In the long run it is quite likely that this method would be found the most satisfactory. The immense practical value that would result from securing a strain of hogs resistant to cholera is readily seen.

Just as we have economic entomologists so will we have economic animal geneticists. Experimenting on an extensive scale in breeding for disease resistance in higher animals is only a matter of time, unless some unforeseen obstacle arises to prevent. The need for such work cannot be questioned.

April cold with dropping rain,
Willows and lilacs bring again;
The whistle of returning birds,
And trumpet-lowing of the herds.

Animal Husbandry at John Swaney School

L. O. YODER

At the John Swaney Consolidated School four years or eight semesters of agricultural work are given. Of these eight semester's work, three are given up to Animal Husbandry.

We begin our Animal Husbandry work with a study of the horse. The difference in form between the draft, coach, and roadster type are brought out, and the students are led to see the relation between conformation and use. This work is done mainly in the class room, for the boys are all from the farm and are familiar with the different types. The class-room discussion is at once followed by practical work in judging horses. Score cards similar to those found at the Agricultural Colleges are used; the students first make independent scores, and when all are done the scores are compared and either raised or lowered as occasion demands.

The work of judging is accompanied and followed by a study of the market classes and grades of horses. The question of the best horse for the farmer to raise is taken up and dwelt on at some length; this was a point which the boys greatly enjoyed discussing. We gave a little time to a history of each of the common breeds of horses, using Plumb's "Types and Breeds of Farm Animals" as reference. This year we gave one week to a consideration of the cause and treatment of some of the common diseases of horses. The subject of blemishes in horses was passed lightly here, that subject having been taken up along with the judging work.

A study of beef cattle was next made. The market classes and grades of cattle were studied, and the characteristics of a good beef animal from both the buyer's and feeder's standpoint were

emphasized. This brought out the importance of quality and type. It also gave them an ideal to have in mind when buying feeders and an ideal to strive to attain as the result of the feeding. We tried to do some judging of beef cattle, but Holsteins were the best we could get. A condensed history of the principal four beef breeds was put in the note books—Plumb's book being the source.

The second semester's work is devoted to dairy cattle and dairying. A number of high grade Jerseys are kept on nearby farms which enabled us to do much practical judging work. The judging work was preceded by a study of type in dairy cattle: the type being developed by a consideration of drawings showing the wedges and by class discussion. A study of the dairy breeds was made similar to that made of the beef breeds. We discussed the formation and grading up of a dairy herd,—the rearing of calves,—the feeding of dairy cattle,—the returns which a dairy should bring,—the handling of milk and dairy products. We borrowed a Babcock milk-tester and ran enough tests to familiarize the boys with the method of running a test. Some years the boys have been required to run a 7days or 10-days test at home.

The third semester's work in Animal Husbandry comes the second semester of the senior year. The points taken up in this course are, I think, sufficiently indicated by saying that it is a course in the elementary principles of stock breeding. The book put into the student's hands is Shaw's "Animal Breeding," but this is supplemented very extensively by reference to Davenport's "Principles of Breeding."

A Summary on Apple Breeding

C. L. LONG

THERE seems never to have been a well ordered effort to improve the apple by breeding. Most of our fruit trees that grows naturally are chance hybrids. It is true that plant breeding, until the discovery of the progress made by Mendel and his followers, was not much of a science. Mr. Luther Burbank has used this method of chance, deliberately, with results that are well known. His creations of flowers, plums and walnuts are wonderful segregations of the desirable qualities of various ancestors. Mr. Burbank, a pioneer, used the facts of science and got results before the scientists had worked out the laws.

There appears to have been no time when even what was known in plant breeding was used to any extent in improving the apple. As all can see, it is much more difficult to put the principles and methods of plant breeding into practice with the fruits. Much more time and money are required to secure results, and plant breeding has been so changeable that it has been impossible to lay out an experiment in crossing apples and complete the work as planned. The laws of breeding as known have been worked out with herbaceous plants and fruits and fruit growers have very generally believed that fruit trees do not follow the same laws.

We shall now, with our present knowledge of plant breeding, be able to breed the apple with much more ease than in the past. Under the stimulus of the Mendelian ideas sufficient data has been produced to enable plant breeders to shorten and improve their methods. The old feeling of uncertainty is largely gone, the limitations

are better known, and the breeders can work from a more substantial footing. While the apple breeder's task is a much more difficult one than that of the farmer's, gardener's or florist's he has the advantage of a new field to work in.

The improvement of the apple has come about largely by the introduction of new methods. That is, there is no definite evidence that a variety is ever changed for better or worse by selection. Scientific thought seems to be almost wholly against the transmission of acquired characters, as most variations appear to be, and against continuous selection as a means of improving plants grown from seed, and would be, if directed against bud-selection, just as objectionable. The variability to be seen in all varieties of apples must be due to the difference in environment, rather than changes in the characters. Environmental changes produce modifications in many of the characters of the individual tree but there is nothing to show that these changes effect the varietal characters. These variations appear unless the individual tree has a different environment, and when returned to the same environment they disappear.

None of the varieties of apples grown in America are known to have come from self fertilized seed. There are no records of attempts to obtain new varieties of this fruit by self-fertilization; but it is a well known fact that the apple is partially self-sterile, the blossoms of some varieties being wholly so. The seedlings produced from self-fertilized seed are usually wanting in size and vigor. From these facts it would appear that the use of self-fer-

tilized seed does not promise much in breeding apples

But few named varieties are certainly known to be results of crosses. Yet in spite of this lack of exact knowledge, it seems very probable that nearly all varieties are crosses, because as has first been stated, apples normally prefer cross pollination, and self-fertilized seedlings lack vigor and would soon be largely weeded out by natural selection.

If it is true that the apple is to be chiefly improved by this method, a little manual skill, a knowledge of what exists and what is wanted, together with a definite knowledge of the laws of plant breeding, would be all that is needed for breeding apples.

A few varieties are known to have come from sprouts or mutations, but this evidence seems to show that these

varieties have played a very small part in bringing into existence new varieties. The few varieties known to have come from bud-imitation, differ from their parent trees in but few particulars, such as color of skin, shape or size. They represent only modifications of existing characters. They could be better called new strains or races of the old variety rather than new varieties. Their exceeding rarity compared with the countless numbers of varieties which are not transmitted thru heredity, shows that varieties of apples propagated from vegetative parts, are very stable and practically continuous.

A breeder will not be able to produce new characters by working with Mendelian characters, but he will be able to weed out the undesirable characters and bring together the desirable ones of our known varieties.

Agricultural Education in Great Britain

PROF. WM. R. LAZENBY

ALL genuine agricultural education has two objects in view—first better farming, gardening, orcharding, etc.—and second, better men and women, morally, intellectually and socially.

All people are interested in the first named object because the world must be fed and clothed. The soil, including what grows thereon, is indispensable to our existence. To know how best to conserve and build up the soil, so as to make it more and more productive helps everyone.

We may judge of the condition of agriculture in different countries by several tests. Among these may be mentioned the rotation practiced, the kind of stock reared, the condition of the country roads, and the extent of land uncultivated or poorly cultivated

in proportion to population.

The fairest single test of good farming is the average production of the land. Judged by this test the agriculture of England and Scotland is better than that of the United States. How far is this due to Agricultural Education? Let us briefly consider. It is nearly one hundred years ago that the principles of agriculture were first introduced in the elementary schools of England. By principles I mean the results of scientific investigation. For example, it was well known a century ago that all substances containing nitrogen in a certain form are more or less useful in the growth of crops, or it was equally well known that all substances containing phosphate of lime are capable of being useful. These are

principles that any boy can readily learn, or any practical farmer can apply.

The teaching of these principles in Grammar and Normal schools of Great Britain and Ireland, as a regular branch of instruction, was the beginning of Agricultural Education in that country.

The first Agricultural College was established at Cirencester in 1844. This was the result of much agitation and discussion on the advantages of a specific education for agricultural stu-

A few years ago it was reorganized under a new constitution and since then has been quite prosperous, although the number of students is small compared with the number in similar institutions in this country. The main college building is a picturesque old Gothic structure built in the form of a quadrangle. It has a good location on the college farm, and includes the ordinary class rooms, laboratories, museum, and library, as well as the dining hall and rooms for from 50 to 75 students.

The college farm which surrounds the



dents. This agitation culminated in the following resolution—"That it is expedient to provide an institution in which the rising generation of farmers may receive instruction at a moderate expense, in those sciences a knowledge of which is essential to successful cultivation; and that a farm should form part of such institution"

This was the inception of the oldest College of Agriculture, which secured a royal charter in 1845. In its younger days, in fact for nearly the whole period of its existence, the college encountered many difficulties, mainly financial.

buildings contains about 500 acres, of which about 300 are cultivated and the remainder pasture. It is divided into about 20 fields varying from 10 to 50 acres in size. The farm appeared to be well managed, and the live stock on it of fine quality. The number of distinct breeds was disappointingly small, and perhaps too much stress was put on prize stock. It may be said that the farm which is incorporated with the college, and which is intended to serve its full use for all purposes of practical instruction, is under the direction of an old graduate of the college who is a

high class farmer. As the farm manager has no other duties, the practical business character of the farm is insured. In fact, the farms of all the agricultural colleges of Great Britain are placed on a strict commercial basis, and are made to "pay." They are demonstration farms, not experiment stations.

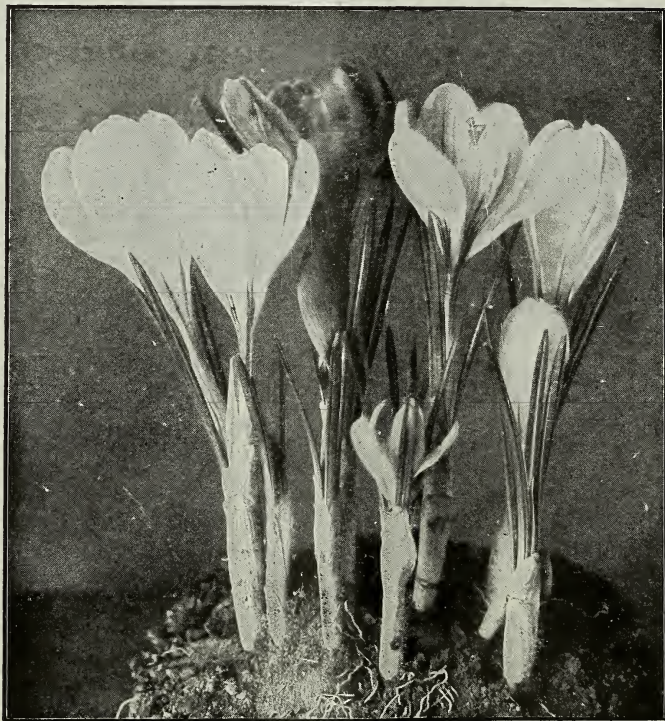
Some land—over 50 acres—at Arrester, is specially reserved for investigation on strictly experimental purposes.

In addition to agriculture and horticulture in their various divisions, there is a department of veterinary medicine and one of forestry.

The degree course, or one leading to a diploma, is three years in length. The students come chiefly from advanced public schools and universities. They are usually the sons of large-landed proprietors, leading farmers, and professional men. Some are retired officers of the army, navy or some branch of civil service.

Short courses are given for the sons of tenant farmers, and in summer there are classes for teachers in nature study and similar subjects.

The Southeastern Agricultural College at Wye, near Ashford, Kent County, was opened for the reception of students in 1894.



European Floriculture

REED O. BRIGHAM
University of Illinois

A FEW years ago while making a tour thru Europe, I was impressed by the great profusion of flowers found everywhere as compared with our own country. Flowers and garden designs abound in all places from the old royal palace at Versailles to the humblest peasant's cottage; from the fertile valleys to the Alpine heights. Perhaps this is due to the more thickly populated conditions, or to the fact that Europeans take life more slowly and look more to the beauties of nature and real life in the garden.

When I landed in that northern seaport of Germany, Hamburg, a city not appreciated by tourists, I was upon my first drive impressed by its beauties, not in fine buildings but by the development of the beauties of nature; everywhere abounded small green parks, and in many of them artificial lakes, pleasing and restful to the eye. Altho the houses are built in blocks with small yards, in row after row of these houses all of the windows are filled with window boxes in which are set flowering plants and hanging vines, breaking the monotony and adding much to the beauty of these stone fronts.

From here, pass into the land of canals and dikes, Holland the land of tulips and visit in one of the large cities a flower market, which is typical of the cities of Europe. This market extends three or four blocks with lines of stalls where women are selling their goods. Flowers of all kinds and a vast variety of colors are displayed. Such a scene never gladdens the sight in our American markets. Leaving the market and passing along one of the numerous canals you see boats coming in from the

country laden with flowers for the market equivalent to a river carnival all the time.

Go now from Holland with her wind-mills and bright, variegated flowers to Switzerland with her snow capped mountains and still we find flowers abounding, not the gay, bright hues but the modest white blossoms of the Alpine edelweiss are sold to us in bunches by the children as we cross the passes.

Travel to the land of the Midnight Sun and you have not escaped from the floral beauties of nature. Up in this northern clime one afternoon our ship landed for a few hours at Molde, the "City of Roses" and here a great profusion of these flowers is found equal to any I have ever seen. On the 27th of July in Hammerfest, the most northernly city of the world, I saw tulips blooming in door-yards and dandelions along the pathways.

Even in Russia where the poor are so down-trodden and dejected, the beauties of nature have not entirely been forgotten. Flowers were here found in the parks and palace grounds, but the country homes were marked by desolation in unfavorable contrast with the English cottages of rural communities. In Warsaw I visited the palace of the Countess Potecki, and in the gardens of this palace was a vast collection of beautiful flowers and trees, some which attracted particular attention were the fuschies of rich, deep colors, hanging in large clusters, the bushes as large as rose bushes of the dense forest grounds of this garden. An exquisite collection of a large number of varieties and colors of orchids

were found upon the trees. Altogether, it made a place well suited for deep thought and communion with nature in her solemn mood.

A day in the city of Vienna showed her in dress attire in honor of the Emperor's birthday. Everywhere was a profusion of flowers; baskets of ferns and blooming plants were placed on the lamp posts of the streets, and beautiful window boxes predominated.

A real home worth living to enjoy, such as Ann Hathaway's cottage at that quiet English village Startford-on-Avon where I spent a day.

Pass down the lane leading to the ruins of old Kenilworth Castle and against the moss covered stone way you will see leaning a hedge of pink and red roses, blossoms in great profusion as large and handsome as our American Beauties. Drive out over the



THE PALACE AT VERSAILLES.

Perhaps the traveler is impressed the most as he travels thru Great Britain; not a single corner is left untouched by the hand of man, no waste places for weeds to grow. Every rural cottage with its thatched roof was surrounded by its stately hedge and the garden tho small was one mass of colored shades and shadows blending as in a picture.

country roads and notice scattered over the fields, the red iceland poppies. Go to Scotland and see in every dooryard the soft and varigated pansies, the largest I have ever admired.

Such is a brief glimpse of the floriculture of Europe, and could we Americans but take a lesson, life would be more worth the living and happiness would everywhere abound.

Observations on Landscape Work at Washington, D. C.

W. E. BONTRAGER
Ohio Experiment Station

WASHINGTON is a city of wide, spacious streets, stately avenues of trees and bewitching vistas, of classic, monumental buildings, inviting gardens and public grounds which exemplify much of the purest and best in ornamental planting for artistic and beautiful results. Few cities can boast such gems of architecture or sculpture as the Capitol, the Library of Congress, the Treasury Building, the Corcoran Gallery of Art or the Columbus Memorial Fountain, each of which dominates some part of the landscape and contributes to its beauty in the same measure as the noble specimens of oak, ash, elm and maple dispersed in picturesque groups and formal avenues or the wide stretches of velvety lawn. So intimately blended and interwoven are natural and artificial features that it is not easy to dissociate them. However, as it is desirable at this time to dwell upon the natural features of Washington's landscape rather than those of a purely architectural character, we shall undertake a brief study of the trees, shrubs and plants used in the various public grounds, designating from time to time at least a few that might with propriety be used by home improvers in Ohio.

At an early day the location of trees in the grounds closely surrounding the Capitol was outlined in the main by such leaders of the naturalistic school as Andrew Jackson Downing and Fred-eric Law Olmsted. To their judgment and cultivated taste the public is therefore indebted for the majestic clump of fine forest trees grouped naturally about areas of lawn in such a way as to display or conceal buildings, accord-

ing as these are attractive or unsightly. So skillfully have groups and specimens been located that the effect is one of charming natural groves and meadows.

In addition to the well known trees growing in our many forests, many rare and uncommon species, both native and foreign, were used in these early plantings. One specially striking group near the capitol is composed of the luxuriant Southern Magnolia (*Magnolia grandiflora*). Glistening in the sunlight almost as if varnished, this beautiful tree is undoubtedly among the finest of all broad-leaved evergreens. It is not hardy in the north and a supposedly hardy variety known as "Illinois Hardy" which was tested at the Experiment Station a few seasons ago perished the first Winter. Good old specimens of the well-known Cucumber Tree (*Magnolia acuminata*), excellent for avenue planting, and the Large-leaved Magnolia (*M. macrophylla*) are also to be seen. The latter has leaves two or three feet long hence is decidedly tropical in aspect. It is hardy in Ohio when once established, as is also the delightfully fragrant Sweet Bay (*M. glauca*), of which at least one large specimen is to be found in the Agricultural Department's grounds. This tree, which occurs perhaps oftenest in the form of a large bush, is known to grow naturally as far north as Boston. The powerful fragrance of its blooms is perceptible at a distance of a quarter of a mile.

Another broad-leaved evergreen of which occasional trees are seen about Washington and which should be more

generally cultivated in the north is American Holly (*Ilex opaca*), a common wild tree or bush in New Jersey and other states to the southward. Closely resembling the renowned English holly, this species is a worthy substitute for it and ought to appear much oftener on northern lawns, where the number of broad-leaved evergreens which do well is comparatively small. Some good specimens are known to exist at Marietta, Ohio, and also as far north as Holmes county, there is little doubt that it can be successfully grown in most parts of our state. In extremely cold and exposed localities this holly should be planted in a sheltered nook among larger trees. The Tree Box (*Buxus arborescens*), which must not be confused with the more familiar dwarf box so often used in colonial times as an edging or border to garden beds, is also a good broad-leaved evergreen of which one sees numerous acceptable specimens. Tree Box is extremely long-lived and makes in time a very attractive shrub ten to fifteen feet high, which can be grown in most parts of Ohio if located on the north side of buildings or under the shade of trees to prevent Winter injury to its foliage by alternate freezing and thawing.

Good, well rounded masses of shrubbery, so essential in many instances to apparently unite the verdure of large trees with the green of a lawn, were conspicuous by their absence. Plants like the Rugosa rose, *Spirea Van Houttei*, the *Viburnums*, Bush Honeysuckle and Japan Barberry as well as the larger-growing White Fringe, *Philadelphus* and *Altheas* are used sparingly, if at all. To almost entirely exclude these materials which add a fullness and well-furnished effect, gives to the lawn planted with tree growth only a somewhat bare, unfinished appearance.

Although too many trees of inferior species have been admitted, there is probably no American city where one can inspect so many wholly satisfying rows and avenues of the valuable, long-lived kinds best suited to such purposes. The stately avenues of Plane or European Sycamore growing along the walks that lead directly into the capitol grounds certainly leave little to be desired as one contemplates the enormous reach of their limbs and branches which interlock overhead and have the effect of an arbor to protect from the sun's rays. The Ginkgo or Maidenhair Tree from China and Japan has been used in the formation of a unique avenue at the entrance to Department of Agriculture. This curious, deciduous conifer appears to have great promise as a street tree on account of apparent immunity to smoke and gas as well as to fungus and insect injury. As the trees composing this avenue have been planted too closely, permanent injury from crowding will undoubtedly result if systematic thinning be not practiced soon. Such species as the Pin Oak, Red Oak, Liquidambar or Sweet Gum, Tulip Tree or Whitewood and Norway Maple have also been used with telling effect. As pruning and protecting have been done with unusual care, results that are highly pleasing have been secured in cases where the less desirable species have been employed.

A place of much interest is the National Botanic Garden, which is situated but a short distance from the Capitol. Though its area is not great in extent, the collections embraced are extremely varied and interesting. The tropics have contributed richly-colored foliage plants, rare ferns and palms. Plants of this class are housed in a well-kept conservatory, although in summer many of the larger specimens

which are grown in tubs and boxes are used for lawn ornamentation. From temperate regions have been obtained new trees and shrubs, many of which will probably become lasting additions to the planting material now available. growing here is a large Emperor Oak (*Quercus dentata*), of which the foliage is unusually large, rich and glossy. A large spreading specimen of European Hornbeam (*Carpinus Betulus*), also a very large Magnolia mentosum, Cut-leaved Beech (*Fagus sylv. asplenifolia*), Crataegus tomentosum and a low, spreading dwarf oak (*Quercus banisteri*) were other species which enlisted attention in passing. To particularize minutely at this point is of course impossible. Nurserymen and florists should not overlook an opportunity to familiarize themselves with uncommon things in the plant world such as is afforded at this garden.

Arlington, the national soldiers' cemetery, so called after the home of Gen. Robt. E. Lee, which is included within its limits, is located in Virginia on a very high bluff overlooking the Potom-

ac. On account of its elevated, commanding site, the outlook from this point is seldom equalled. From the veranda of Arlington House, a well-preserved mansion of the colonial type, is to be had a wonderful panoramic view of Washington and its environs, said by many famous travelers to be one of the most impressive scenes they have ever looked upon. Beyond the sluggish Potomac appear as central features in middle distance the Washington Monument and the Capitol, around which are grouped the less pretentious edifices of the town, while far away are seen a rim of encircling hills and to the southward the towers and spires of Alexandria. As one studies for a time this fascinating picture of the classical city about which is woven so much of our nation's history, the vision inspires awe and reverence. The lawns about the mansion and in all parts of the cemetery are neatly maintained. Good specimens of English Yew and Irish Yew, a more nearly erect form, and also a well-kept hedge of dwarf Box were observed in the grounds.





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COLUMBUS, OHIO, APRIL, 1913.

Editorial

Along about this season of the year, after a period of rather exacting study and apropos of a seemingly interminable period of constantly handing out good hard cash, indiscriminately to the right and to the left; don't you sometimes catch yourself figuring and calculating and pondering and finally asking "after all does it pay?" Sometimes it seems so easy and altogether so highly desirable to merely quit studying, take a position, and get on the profit side of the ledger again.

Well do we remember the words of one of our own respected professors in reply to our lament, voicing the above sentiment during our second year at this institution. He said, "Stick to it, young man. It may seem like a heavy expenditure at present but just consider that you are making one hundred dollars per month by going to college."

This seemed like an extravagant statement at the time, but it reassured us and even now we can see that this statement was literally and absolutely true.

Let us figure for a moment. How much will your four years at college cost you? Let us say three thousand dollars, including the amount which you probably would have saved had you been working on a salary during that period. Ten per cent of this sum would be three hundred dollars. Will your earning power be increased that much at the end of the four years? Well we should say so. You will be lagging below the average agricultural graduate if it is not soon increased to double that additional amount. Then when you figure in the personal satisfaction, the broadened viewpoint, the deepened capacity for enjoyment, the valuable associations and friendships and partnerships, all derived from your college course, you must agree with us that

you have made more than one hundred per cent on your investment.

"Stick to it young man. You are making one hundred dollars per month by going to college."

"Phew! Hey boys!!! there's a terrible stench arising from the Agricultural Society and the offices of the 'Ag' Student! **THAT SCANDAL!** Shut your eyes and hold your noses. Don't look! Just listen while I swat them one! Beware! Wow!!!!—Editor, The Lantern.

'Tis truly a super—acute ear (or nose) that our esteemed contemporary keeps to the ground and I am sure that the entire student body must feel profoundly grateful for such a virtuous sentinel whose eagle eye permits him to discover a mountain where not even a molehill exists. Likewise we must admire his courage. Any one who would so fearlessly launch forth upon an extended dissertation on conditions and denunciation of methods, when his entire stock of information was so lamentably meagre as to cause him later to profess ignorance, certainly possesses courage in a superlative degree. Then again we must not omit paying a tribute to his agility and skill. After every charge had been refuted, after he had admitted his lack of information on numerous points at issue, after he had partially apologized to one of the principals injured by his previous statements, after the Publication Board had virtually asked him to publish a retraction, and in the very face of his announcement of dire maledictions and exposures to follow, this remarkable agile man executed a double back-hand flip-flop and found himself a-straddle of a neat little editorial to the effect that he had been misunder-

stood, but that he had won his point and was ready to quit.—Well, so are we ready to quit—as far as that is concerned. We have not constituted ourselves watch-dogs nor guardians over anybody, neither are we engaging our time in harboring futile animosity. We are simply getting out an agricultural periodical to the best of our ability—and finances. And speaking of finances, reminds us of the rumor we heard the other day concerning the enormous profit the management makes from the "Student." Won't you please come around and investigate for yourselves? Yes, please do. After we have shown you our interminable printing bills and postage bills and engraving bills and general expense bills, et cetera, et cetera, we feel quite certain that we could borrow a ten spot without difficulty.

Shall we blame the Ohio farmer for the recent aqueous devastations? It seems like shouldering off a great deal **"AND THE FLOODS CAME"** upon shoulders already heavily burdened but we must admit the farmer's complicity and recognize the fact that the ever increasing heights to which floods attain is a direct result of intensive agricultural development. The swamps and marshes and forests which once acted as great sponges and reservoirs to suck up the waters and retard their flow, have gradually given way to the ditcher's spade and the woodman's axe. Today when the flood gates of heaven are opened, the artificial ditch and the underground tile offer ready means to send the water gushing into already overcharged streams and devastation is inevitable.

But shall we criticize the farmer for thus converting a worthless waste into fertile fields, No! Better criticize the

engineer for not recognizing the new need for better protection along the water courses. Cities are no longer so dependent upon water that they need be placed at the water's edge; rivers can be straightened, storage and retarding reservoirs can be built; and even the project to dig artificial rivers in certain extensive territories is not so fanciful as it might at first seem.

Nothing can prevent progress; but sometimes it requires a catastrophe to point the pathway.

The First National Conference on Marketing and Farm Credits is just closing in Chicago.

FARM CREDIT CONFERENCE The Southern Commercial Congress has appointed delegates and everything is in readiness for an extended tour of the Old World for the purpose of studying farm credit plans. The Government, likewise, has appointed delegates for the same purpose. The farm magazines and daily papers are redolent with news and suggestions concerning the same. Apparently something is to be done; and surely it is high time.

Out of the confused mass of sugges-

tions we perceive two distinct general plans: one which tends to mass the bulk of the agricultural securities in such a way as to form merely another huge item for Wall Street speculators; the other tends to keep the securities more widely distributed and furthermore exerts a powerful influence for the development of a spirit of community cooperation. This last factor is of most vital importance. Co-operation is the one thing which the American husbandman so persistently refuses, and at the same time the one means through which the ultimate solution of the marketing problem must apparently be brought about.

In our own opinion, and at this early stage of discussion, we should look askance upon plans involving the first mentioned principle and insist that the system finally adopted include the cooperative feature.

At first it might seem that this duplication of investigative work could end only in confusion, but this approach from many angles and by many interests will probably supply the necessary series of checks and balances which will result in the final adoption of a perfect system.



CURRENT AGRICULTURAL LITERATURE

COMMENTS AND CRITICISMS ON
CONTEMPORARY CONTRIBUTIONS

How to Grow Vegetables, by Allen French. Each vegetable is discussed together with its complete planting table. The topics set forth are taken up in systematic order including such points as: soil, distances, sowing, depth, transplanting, thinning, setting, harvesting, frost protection, diseases, insects and storing. The Mac Williams Company, 66, Fifth Ave., New York.

A Manual of Practical Training, by John McLennan. A simple treatise of practical farming written for the farmer or student of agriculture. The book includes such subjects as drainage, preparation of the soil, fertilization and crops as well as the various phases of animal husbandry. Price 50c. The Mac William Company, 66 Fifth Ave., New York.

"Wanted: The Thousand Pound Cow," is the title of an article by Professor Oscar Erf in the issue of the Country Gentleman for March 22nd. Professor Erf points out the economy of the high producing cow and illustrates the results to be obtained in this direction by use of the system of official tests and advanced registry.

The editorial department of The Farmer's Guide, of Huntington, Indiana, is now under the direction of Mr. T. L. Wheeler, who recently resigned

the position of Agricultural editor with the local Extension Department in order to return to the publication with which he was formerly identified

"The Challenge of the Country" is the title of the most recent text-book concerning problems of Rural Life. It is published under the name of G. Walter Fiske of our own state who has made a thorough investigation of country life and presents many unprejudiced views of the past, present and future. It is broad and diversified, full of life and energy and keeps close to fundamentals and facts. A new vision is given one who reads it and it will be of particular interest to the Agricultural Student who is desirous of bettering his local rural community. Published by The Association Press, N. Y. Cloth 75 cents.

Professor Rolla C. Lawry, manager of the "Yesterlaid" Egg Farm of Pacific, Mo., has published a book entitled "Poultryology." The commercial phase of Egg Farming is the gist of the book, together with adequate chapters on other phases of Poultry Raising. It is clear and concise, and is devoted to facts and fundamentals rather than to theorizing. To the man interested in Poultry this book will serve as a true guide to success. It may be obtained from the above address for one dollar, —cloth binding.

ALUMNI WHAT THE BUSY GRADS ARE DOING

Mark Francis, D. V. M. '87, who is Professor of Veterinary Medicine at the Agricultural and Mechanical College of Texas, stopped off at the University while en route to Ithaca, New York, for the purpose of inspecting the equipment of the Cornell Veterinary Department with the view of installing similar apparatus at the institution with which he is now connected. His eldest son will enroll in the freshman class at the University this fall and in 1915, Mr. Francis states, that another son will likely enter the University. During his brief visit at the office of the Alumni Association he talked most interestingly of conditions at the University and in the North End of the city when he was an undergraduate, and of the good old times in the North Dorm. He remarked that, contrary to the general impression, less studying was done in the North Dorm by the inhabitants thereof than was accredited to those individuals, although the percentage of flunks was very low. Mr. Francis is very enthusiastic about the resources of the state of Texas and of the future of the institutions with which he has the good fortune to be associated. He is a member of the Board of Visitors of the Ohio State University, and actively interested in the work of the Association and the proposed Dormitory scheme.

Harold McKay, '12, who recently married Miss Ila Haworth, is engaged in farming near Wilmington, Ohio.

C. B. Perkins, '12, a practicing veterinarian at Centerburg, O., was a recent caller at the office of the alumni association and attended the veterinarian convention held at Columbus in January.

A. H. Benton, '12, of State College, Pennsylvania, took advantage of the Easter vacation to visit friends in Columbus. His stay was indefinitely extended due to the demoralization of the train service to the East.

A. C. Brookley, '12, Adrian, Minnesota, was another Easter visitor to Columbus who became marooned by the flood and was forced to stay a week longer than his scheduled time.

L. L. Heller, '12, Washington, D. C., recently stopped off with friends on the campus for a few days. He reports work progressing very satisfactorily at the Bureau of Animal Husbandry where he holds the position of Junior Animal Husbandman.

O. M. Kile, '12, who until recently had been taking graduate work here and was also connected with the local Extension Department, left last week for Morgantown, W. Va., where he has accepted an excellent position as agricultural extension editor for the University of W. Va. He will have charge of the publicity work and the syndicated agricultural articles sent out to the various county and farm papers. In addition he will do a certain amount of special lecture work in various sections of the state.

WITH THE BREEDER

NOTES OF INTEREST AMONG THE FLOCKS AND HERDS

Sheep Feeders will be interested in the bulletin issued at the Ohio Experiment Station treating on "Rations for Fattening Range Lambs." It is written by two sheep experts and gives reliable information.

The Ohio Experiment Station has recently issued a bulletin entitled "Barnyard Manure." The stockmen of Ohio should obtain this publication as it treats on one of the great sources of loss in efficient stock raising. No one will deny the value of good manure and to keep this value as high as possible should be the desire of all enterprising stock-growers.

T. H. Russell, proprietor of the celebrated "Idle Hour Stock Farm," will hold a large sale of his Holstein cattle on May 1st and 2nd. Mr. Russell's farm is located at Geneva, O., and is one of the greatest Holstein farms in the middle west. His cattle are tuberculin tested and approved by the state authorities. Each one is registered and a prospective buyer may rest assured that he will get the best for his money. Mr. Russell has been a progressive agriculturist for many years and the results of his labors are bearing fruit today.

C. H. Browne, of the U. S. Department of Animal Husbandry, has received an order for 7000 cavalry horses from the Turkish government. Too bad we can't take the money, but we haven't the horses.

The fine saddle mare, White Heart, sold for \$3,000 at the mid-winter auction sale at Lexington, Kentucky. There was a total of 246 horses sold at the total sum of \$81,380. This certainly discounts the present talk that the saddle horse is sinking into oblivion.

Recent sales of Hereford cattle are indicative of the fact that the red and white cattle are becoming more popular each year. A general average of \$320 per head was paid the past year for nearly 400 head and prominent breeders are of the opinion that these prices will materialize into higher ones.

The most outstanding point in the horse market today is the great desire to obtain the big ones regardless of price. Large firms and companies from coast to coast have large orders placed for large draft horses, but they can not be supplied. Let's get busy then and satisfy the demand.

Secondary Agriculture

Devoted to the Interests of Agricultural Education in High and Common Schools

J. W. HENCEROTH

"Well, children, we have been studying our Agricultural text books very carefully this winter. We have been getting the theory of Agriculture, but today we will make a change in our work. Don't you think the playground looks rather bare?" Here a chorus of "Ohs" greeted Miss Love and a suppressed excitement pervaded the room. "Today we will go outside and see what can be done to improve and beautify our school grounds."

That teacher understood children and knew how to interest them. The teacher and pupils studied the school grounds and laid their plans for improving them. First they cleaned up and carted away the ashes and rubbish that had collected there. The older boys repaired the fence surrounding the school lot. Then they went to the woods and got some trees and ferns and planted them in the proper places. The trees were grouped and set around the edges of the grounds, while the ferns were set in the shady places. Flower beds were made, some small shrubs and evergreens were set out, some grass seed sown, so that in a short time the grounds were pretty and Laurel Point School was the talk of the county—and all because Miss Love was a real teacher and knew how to instruct the children.

Let me urge all the boys and girls to enter the state contest being conducted

by Secretary A. P. Sandles. Never has such opportunity as this been offered to the young people of the state. Think of the lasting benefits to be derived from such a contest. For there is the prospect of a trip to that most important city in the United States—Washington, D. C., with a trip down the historic old Potomac to Mount Vernon and a visit to the home of the Father of His Country. Never will the writer forget his visit to Washington and he covets the same pleasure for every boy and girl, every man and woman in this glorious land of ours. Like the old Mohammedans who traveled to their sacred shrine, every citizen of the United States, some time in his life, ought to visit its capital city and to walk over the streets and through the halls where our greatest men walked and lived and even died for their country.

While you are entering the state contest it will be well to have a local contest as well. Professor Sheets tells something about this in his article. Though we are all a part of the state, our immediate community concerns us the most. It is there where we spend the most of our time. So let each community have a local contest thus stirring up more interest in the state contest and putting into practice those things that we have been learning this year.

THE PLANTING OF SCHOOL GROUNDS.

The public school grounds should be models of excellence in any community, with respect to beauty and good taste in the use of flowers, trees and shrubs.

Such conditions may be very satisfactorily produced with little expense if there be sufficient interest manifested by the pupils in such an enterprise. Native trees, shrubs and vines, frequently, may be obtained with little difficulty from nearby woods, which will an-

use matter, which may be suitably disposed of from time to time.

The materials suitable for school ground improvement consists in trees, vines, shrubs, or flowering herbs. For best results the latter should not be extensively used as they lack permanency of effect, require attention at a season when it can be the least advantageously bestowed and are not available when they can be most largely enjoyed by the pupils. Any trees which it may seem desirable to plant such as



“THE COMMUNITY CENTER.”

Well Fenced and Well Planted. Nicely Graveled Walks.

swer every purpose for successful school ground ornamentation.

There are, it seems to me, three most important factors concerned in the improvement of grounds generally, first, cleanliness; second, choice of materials; third, location of shrubbery.

Many grounds might be very much improved by simply cleaning the premises—removing the rubbish, ash heaps, stones, paper and pieces of boards and brush.

Suitable receptacles should be provided for the accumulation of all ref-

maple, elm, ash, or buckeye should be planted principally at either side and at the rear of the grounds, and if space permits, make groups of two or three trees of a kind. The same practice will be applicable to the trees at the side of the yard. Do not plant trees directly in front of the school building. All shrubbery should be planted in groups in the borders of the grounds and about the school house itself. The shrubs should be planted in such a way as to allow the taller kinds to be in the back ground with the smaller kinds in front

or at the ends of the groups. Better results will be obtained by the use of a smaller variety of shrubs in larger groups than by the use of a large variety used as single specimens.

Vines may be allowed to run up the walls of the building in some cases or to clamber over the fences and help to produce more rapid effects than could otherwise be obtained. Annual flowers in beds should not be planted in front of the house and have very little space in school ground ornamentation. If particularly desired, they may be planted collectively in a plot set aside for the purpose, in the back part of the yard.

Any material taken up from the woods should be handled in such a way as to provide it with a strong root system and to prevent the same from drying out during the progress of transplanting. After transplanting the tops should be pruned back at least one-third to correspond with the diminished root system.

The selection of material to use will depend a great deal upon what is locally available. The best trees will include the elm, maple, ash, buckeye and Norway spruce (evergreen). Suitable shrubs may be selected from the following: Lilac, Honeysuckle, Mock orange, Japanese barberry (*berberis thunbergii*) common barberry, privet, Japanese rose (*rosa rugosa*), Indian currant, golden bell, kerria, spirea arguta, spirea vanhouttei, althea or rose of sharon, snowball, rambler roses.

Among the vines we mention Boston ivy, Virginia creeper, Hall's honeysuckle, and wisteria.

If some annual vines are desired for quick effect the morning glory or dolichos bean are among the best.

L. M. MONTGOMERY,
Landscape Gardner.

BOYS' & GIRLS' AGRICULTURAL CLUBS IN WEST VIRGINIA.

Of recent agricultural developments, there has been none of greater educational interest and significance than the work done by the clubs of boys and girls in agricultural and domestic art undertakings.

(Probably the first well organized contest for boys and girls in West Virginia was conducted in Monroe County in 1907. Since that time, the work done by the boys and girls has attracted the attention of farmers, educators, and business men throughout the state. In 1911 there were 12 counties that had corn growing contests. One thousand five hundred boys and girls took up this work and competed for special honors or awards. During the year 1912 there were 32 counties of the state that took up the club work. There were 4,500 contestants in these 32 counties. While the greater number were interested in growing corn, there were 160 girls who grew tomatoes for the contest. There were also 50 boys who entered the half-acre production contest and grew corn.

The clubs are conducted on a well organized basis, being one of the various lines of work done by the Extension Division of the College of Agriculture, co-operating with the U. S. Department of Agriculture, to extend its benefits to the young people of the state and to interest them in the farm and home life by practical courses of study, effective organization and a form of competitive contest.

To any who are not acquainted with the corn contest, will say that it is when a number of boys and girls enter into competition to determine which can grow the most corn on a certain area of ground, under definite rules of planting, and exhibition of their pro-

ducts. The tomato contest is similar in producing the best yield of tomatoes, under prescribed conditions. It is not merely a club for the purpose of having an organization with a set of rules. True, this idea is used but mainly in an incidental way. Every premium offered for contests has for its object to interest the promotion and encouragement of the regular club work. The premium represents the greatest need and interest of the club membership but teaches the broad viewpoint of the club work and encourages both members and leaders to be progressive and constructive in their work and increases the club members' interest and respect for farm life.

The club work is not a contest in corn or tomato growing where each one who enters is left to prepare, plant, fertilize and cultivate in his own way. The plan of the organization is to instruct, to direct, to guide and to train. The circular of instructions sent to each contestant covers the fundamental principles of good farming and urges the members to keep farm accounts. Efforts are made to have each boy and girl receive attention and instruction on his own acre or the acres of a neighbor boy.

A boy or girl takes pride in ownership and will learn more agriculture and gain more knowledge of the business side of farming on his own acre than from his father's many acres. This can best be promoted by the co-operation of farmers, school officers, and teachers in the different localities where the contest is being conducted.

The corn club work is an important factor in the economy of the farm in directing the rural boys to the business of farming as a profitable and noble profession. The way in which the club work takes hold of a boy is well shown

in Fig. 1, and from this enthusiasm greater interest in farm life may develop. We need the boys for the present efficiency of the farm and we must have their work, their leadership and their influence for the future of American agriculture and rural interests are to endure, and contribute as they should to human comfort and prosperity.

The seed for the corn contest is furnished by the Extension Division of the College of Agriculture except in cases where the contestants enter the contest for production; in that event, they furnish their own seed corn. In a few counties, where sufficient interest is



WINNER IN CORN PRODUCTION CONTEST—YIELD, 140.2 BU. PER ACRE.

manifested, girls' garden and canning contests are being promoted; for these contests. Tomato seed is likewise furnished.

The object of these girls' garden and canning clubs may be summed up in the following: To stimulate the interest in the home; to provide some means by which the girl may earn money at home and at the same time get the education and viewpoint necessary for the ideal farm life; to encourage the rural families to provide purer and better food at a lower cost and to utilize the surplus and otherwise waste products of the garden and orchard; to furnish earnest teachers a plan for aiding their

pupils and helping their communities.

The result already apparent from these clubs are sufficient for West Virginia and for every county in West Virginia to show that club leaders, county superintendents, teachers and others interested in promoting agricultural and rural home interest should lose no opportunity to have club exhibits and interests recognized efficiently at county and district fairs, farmers' institutes, teachers associations, women's clubs, summer chautauquas, etc. Business organizations are excellent mediums for promoting club work and an exhibit of club products. Special contests, essays and general dis-



CANNING TOMATOES IN SCHOOL ON FRIDAY AFTERNOON.

cussions on this phase of the work should occupy some place and time during the regular session of the Grange meetings, Farmers' Institutes, and various other meetings.

The club activities have already in many instances exercised a very stimulating effect upon the ordinary work of the school as well as on the farm and in the home of the members. The knowledge gained from these clubs has demonstrated that the natural love of competition among boys and girls, as well as their elders can be utilized to immense advantage in furthering their own education for efficiency.

The influence of the community at

large, the parents as well as the children, has been wholesome. Beginning with an awakened interest in one thing, better seed corn for example, communities have rapidly extended their interest to other features of rural improvement with the result that in the region affected by the agricultural club movement, there has come about a general upward trend in the thoughts and activities of the people. Setting aside the question as to whether or not boys' and girls agricultural contests may eventually be superseded by more permanent organized developments in general public education, they have at least an undoubted value at the present time and seem to be an important, if not necessary, link in the evolution towards more efficient educational system.

E. W. SHEETS,
State Agent in Charge

Well, teachers, have these warm days been making you feel like getting out doors? As I look from my window I see the grass taking on its summer color, I hear the song of the robin and the bright sunshine is calling to me to come out doors, to cast aside my work and just live with Nature. Now is the time to take the classes on short excursions. Fix up the school grounds, visit the woods and fields to gather flowers and visit neighboring farms, when possible, to study operations there.

Are you going to have a school garden this year? Are you going to decorate the school grounds? Many schools are, and if you wish to stay long in the procession you must keep pace or some one else will be taking your place. We are now at the place where we must do things. It is in the very air. Let us give Ohio the best school grounds of any state in the Union.



April News Notes



"The best appropriation bill we ever had" is what Pres. W. O. Thompson said of the partial appropriation bill passed near the close of the General Assembly. Exclusive of the agricultural extension funds the total appropriation for the University is \$371,730, an increase of \$64,855 over last year's amount. Following are the appropriations that are of interest to the agricultural college.

Apparatus and Equipment.....	\$10,000
Horticulture and Forestry	
Building (partial).....	75,000
Library Equipment	\$10,000
New Roads and Sidewalks.....	3,000
Fire Protection	2,500
Milk Testing	3,000
Botany and Zoology Building..	75,000

Milton Havens, a farmer lad, residing near Delaware, will attend the College of Agriculture as a result of winning a silver cup at the horse and hog judging contest at the Ohio Live Stock Association on March 15, at Delaware. On the morning of the contest young Havens was splitting wood with his father and remarked that he would like to go to the Delaware judging contest and see the animals. After pausing a few moments and looking at his son, Havens, Sr., said:

"Go and get ready son, and if you win I will send you to the College of Agriculture at Columbus."

With such an incentive the lad couldn't lose. He entered the contest, judged a ring of four fat hogs and a ring of four draft horses with remarkable skill, winning the coveted cup from 22 other contestants.

One of the finest equipped and largest special trains known as the "Better Farming Special" was run through southern Ohio over the Norfolk and Western railroad last month. Three lecture cars and an equal number of agricultural exhibit coaches comprised the train. A car load of pure-bred stock was also taken along. Several instructors accompanied the train including Professors Plumb, Paddock and McCall, all heads of their departments.

Ground will be broken sometime this month for the new \$125,000 Botany and Zoology building to be erected opposite Oxley Hall on Neil avenue. The building will be constructed of red brick.

May 17, is the date set by members of the Saddle and Sirloin Club for their annual horse show. The show was inaugurated last year and was a success in every way.

Frank Tallmadge, of the Columbus Riding Club addressed the last meeting of the club on the "Life and Accomplishments of John S. Rarey, the Horse Tamer."

Plans are being made by the State Board of Agriculture for a three-week test of work-horse teams to determine the endurance and adaptability of the different breeds. Percherons, Belgians, Clydesdales, and Shires will be represented in the test, which will take place in August, a week previous to the State fair. The various Registry Associations are asked to select the pair of horses to represent the particular breed.

Great enthusiasm was displayed by both farmers and commercial men in the Rural Life and Ohio Good Roads congress held in Columbus, March 11 and 12. Many strong speeches were made by the leading investigators of the country who are interested in this subject. Among these were Gov. James M. Cox, Pres. W. O. Thompson, H. P. Miller, Phillip T. Colgrove, President of Michigan Good Roads Association; Dr. Chas. McCarthy, of the Legislature Reference Library of Wisconsin; Rev. S. S. Palmer, of Columbus; and T. B. Schmitt of Burkhart.

The resolution adopted embodied the following; that Gov. Cox continue the investigations now being made regarding rural life; that a permanent organization with country organizations be formed; that a commission be appointed to make a complete survey of the state; that a commission be appointed to rewrite and codify all country, township and district laws; that the one-mill tax proposed, become a law, and the plan and scope of the Portage County Improvement Association be adopted in other counties.

Courses in animal husbandary, farm crops, draining, soil fertility and domestic science will be given at the coming summer session of the University. Instruction will be given by the regular members of the Extension department. Laboratories and field plates will be utilized to make the work as useful as possible. The summer session begins June 16 and ends August 3.

In addition to the Corn Growing Contest the State Board of Agriculture plans to conduct a Boys' Apple Growing Contest for a free trip to Washington. Ten trees in a home orchard are required.

Prospects are bright for a big 1913 wheat crop in Ohio. Information gathered by the State Board of Agriculture from correspondents in every county indicate that the winter has been easy on the wheat fields and that there has been practically no damage thus far to the roots by alternate freezing and thawing of the ground. This is in marked contrast to the condition of the wheat crop last year, which was so damaged by the long, severe winter, that the total yield for the state fell to about 10,000,000 bushels. If weather conditions are favorable there is every reason to expect a normal crop of 35,000,000 bushels this year. The estimated 1913 wheat acreage in Ohio is 1,700,000 acres.

Merely as an indication of the remarkable development being made along the lines of applying mechanical power to farm machinery, we note that several of the leading farm magazines are this week carrying advertisements describing a corn cultivator propelled by a small internal combustion engine mounted between the wheels. The added advantage is claimed that the machine can also be used as a stationary engine for performing light work about the barn and dairy.

Farmer institutes gained, in the entire state, about 20 per cent in attendance, in the season just past, over any previous year. Nearly 600 farmer meetings have been held in Ohio during the past three months.

Considerable damage was done to the Poultry Plant in the recent flood. About 250 pullets in their laying year, 2000 chicks in embryo and 12 incubators is a rough estimate of the property destroyed.

An address of more than passing interest to the agriculturist is that of Edwin E. Sparks, '84, '88, now president of Pennsylvania State College. The address is given the subject, "Learning to Live," and was recently delivered before the student body of the University of Chicago. It deals particularly with the agricultural phase of the question and may be found printed entire in the last number of the Alumni Monthly.

In the December number the statement was made that experiments were being carried on at the Poultry Plant. Such is not the case, however, as all experimental work with poultry is done at Wooster. However, accurate records are kept of all operations, so that the students can make comparisons between the different breeds in different pens and under different management.

The State Board of Agriculture has stated definitely that it will furnish hog cholera serum at cost to all those who ask for it, but the virus will be administered only by state veterinarians. The board has asked the government for funds to make a township experiment as to the cure and prevention of hog cholera.

The first 18 weeks of the second international egg laying contest has passed and the apparent results are a surprise to the men in charge. This contest has been, thus far, a Leghorn affair and because of this fact much interest is being taken in the results. The Leghorns have consumed less and produced more eggs than any other breed.

The International Harvester Company has asked the state board of agriculture for space to make a \$12,000 exhibit of home light and power apparatus at the coming State fair.

The large oil-pull tractor of the Agronomy department was submerged during the flood. The extent of the damage done has not been calculated.

The next Ohio State Corn Show will be held at Mansfield, Ohio, in January, 1914. Nearly \$1,000 will be offered as premiums.

Cluster lights now adorn both sides of the main entrance to the University from High street. With the widened roadway and new walks also, this entrance presents a finished appearance.



ANSWERED BY EXPERTS

Questions addressed to Dept. D, Agricultural Student, will be turned over to the particular faculty member most capable of answering, and question and answer will be printed in succeeding number of "The Agricultural Student". Questions will be answered by mail if stamped envelope is enclosed.

Orchard Heating.

What does it cost per acre to equip an orchard with heaters to prevent injury from frost? Is orchard heating proving to be an economical and practical thing?

An experiment in orchard heating to prevent injury from frost made in Indiana showed that the initial investment to prepare for protecting a 10-acre orchard from frost injury is not far from \$500. Professor Paddock of the Ohio State University says the cost of equipping an orchard with oil heaters should be about \$25 per acre. The large heaters burn about a quart of oil per hour and it takes fifty of them to an acre. Orchard heating has proven to be a practical method of preventing frost injury in early spring.

Beans As a Truck Crop.

Are string or butter beans worthy of the attention of the trucker? What income may reasonably be expected from one acre of this crop?—B. A. N. Lorain Co.

Beans are graded by contractors into three grades, viz.: First grade worth \$50.00 per ton; second grade \$45.00 and third grade \$40.00. Sometimes grow-

ers get as high as three pickings in one season. One grower got \$51.00 per acre from two pickings from a two acre plat. Beans are liable to severe damage by dry weather and are not grown in large quantities. The acreage of individual growers is usually from one-half to three acres.

Fertilizing Wheat.

"I would be pleased to have you recommend a grade of fertilizer to be used on wheat: also to give full directions for home mixing of same."—G. C. T.

We recommend as a wheat fertilizer, 3 per cent of nitrogen, 11 per cent of phosphoric acid, and 5 per cent of potash; that is, 400 lbs. of nitrogen, 1400 lbs. of acid phosphate of a 15 per cent grade, and 200 lbs. of muriate of potash will be needed for one ton of fertilizer. The following directions should be observed: place the acid phosphate on a barn floor and pour the nitrate of soda on top of this. After all lumps have been well pounded up, put the muriate of potash on the mixture and shovel thoroughly through some kind of an iron screen. Give it a second shoveling in order to mix it more thoroughly.

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647 Neil Ave. Phones: Auto 4431; Bell 6189.

Will organize a beginners' class Friday evening, April 18th, 7:30 o'clock.

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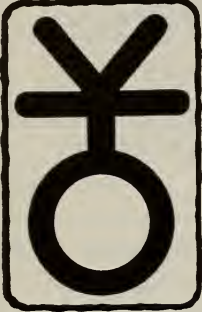
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**The Great
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**and Stock
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Sal-Vet is first a worm destroyer; second, a conditioner; a medicated salt. It contains several medicinal elements which promptly kill and expel stomach and free intestinal worms and in the meantime puts the digestive organs in a healthy, vigorous condition. It sharpens the appetite—tones the blood—puts life and vitality into the whole system. It aids digestion—helps the animal to derive more good from its feed.

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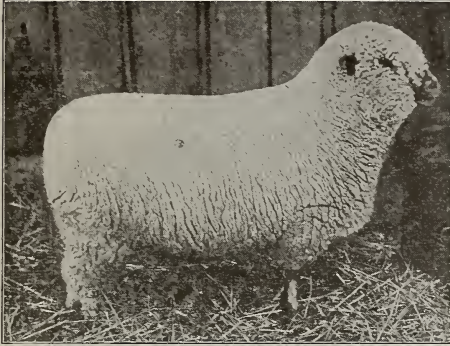
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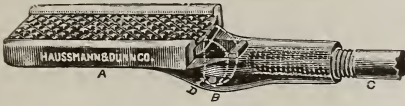


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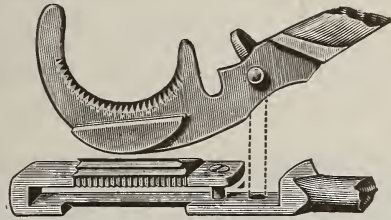
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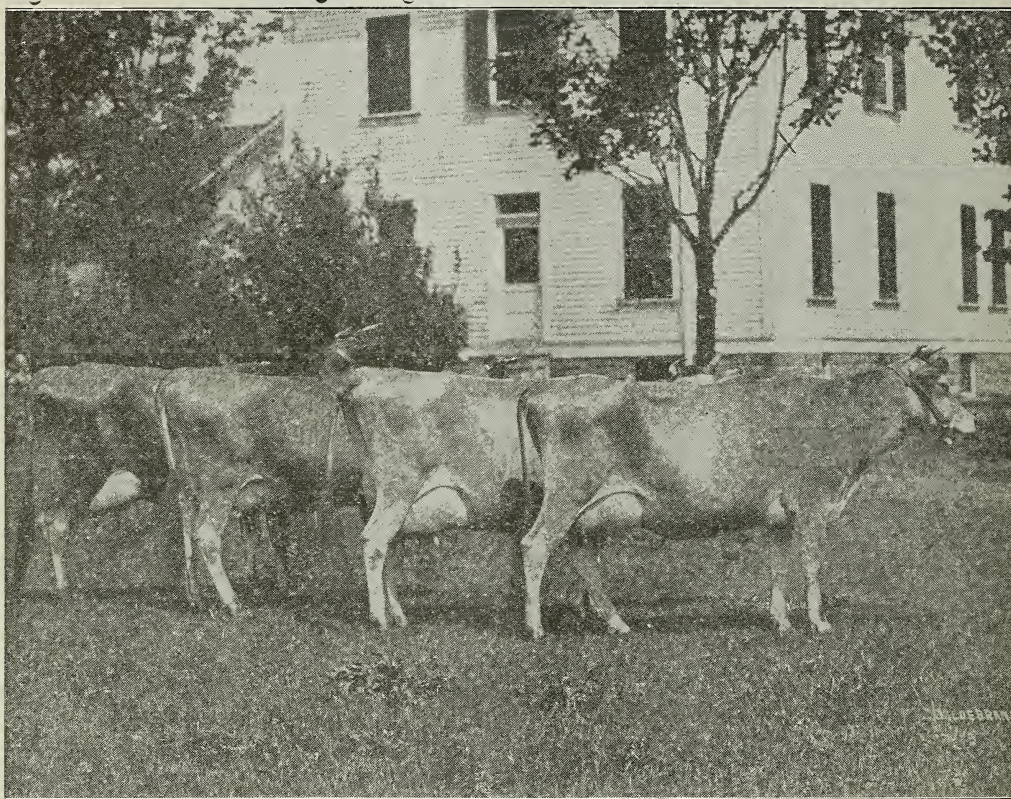
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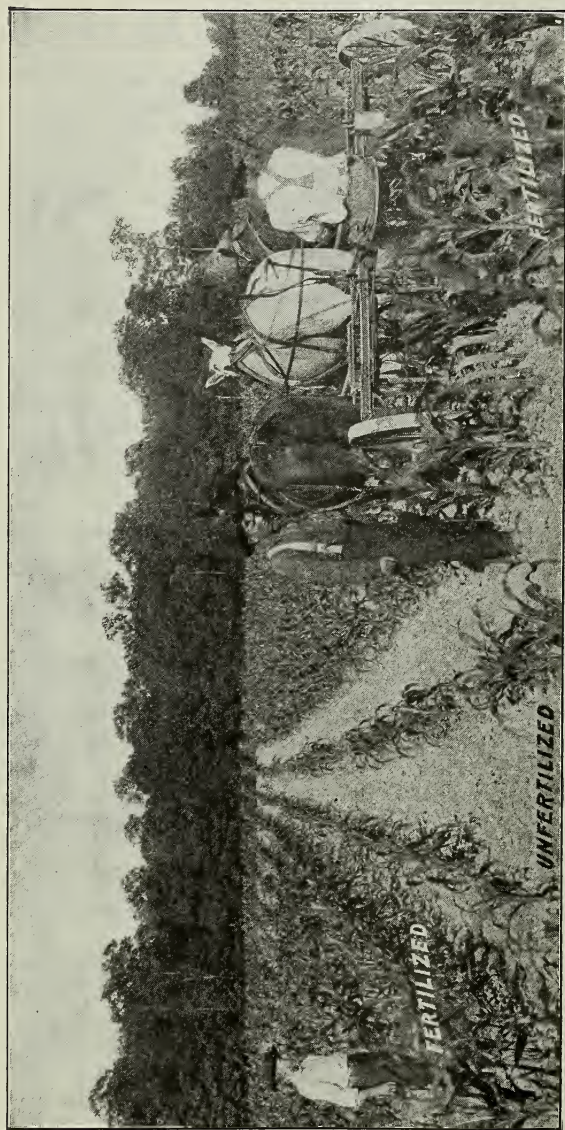
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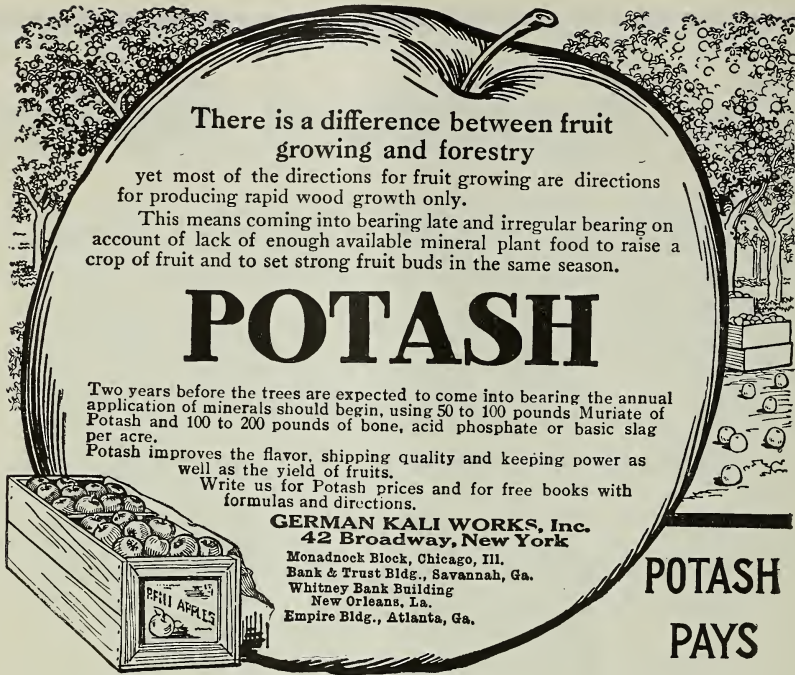
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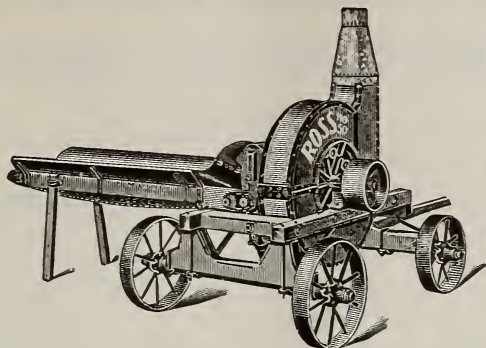
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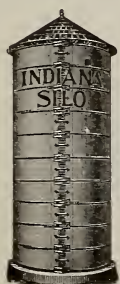
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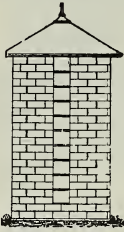
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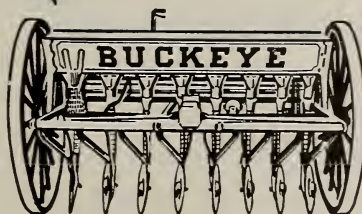
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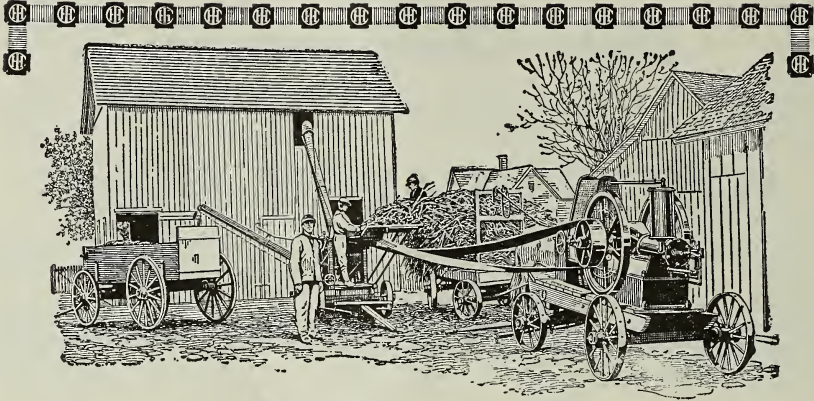
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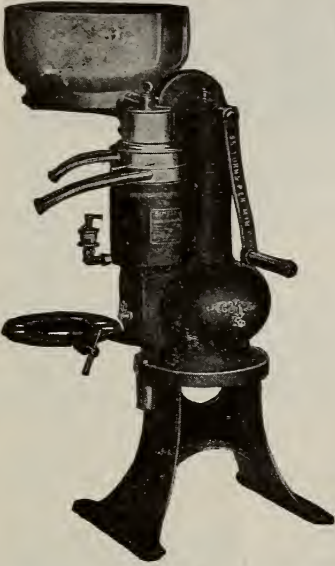
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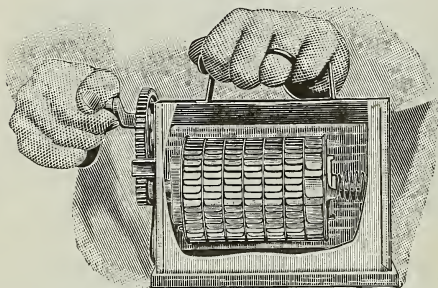
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Fig. 1345

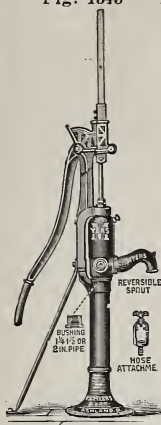


Fig. 1287

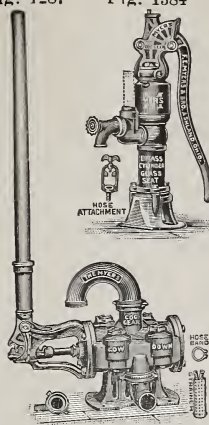


Fig. 1384



Fig. 1160



Fig. 333



Fig. 1138

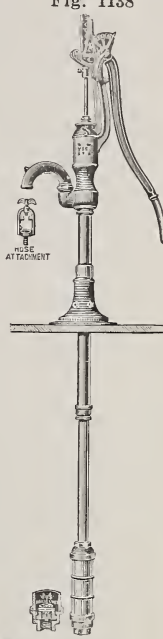


Fig. 813

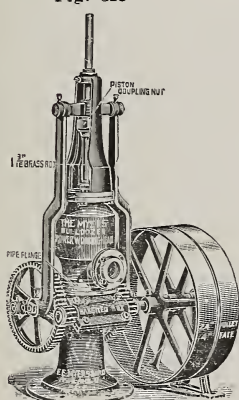
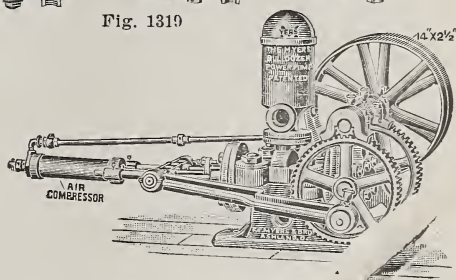


Fig. 1319



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